

# Software architecture for cooperative sensing

Patrick Heyer Wollenberg, Chengjin Lyu, Ljiljana Platisa,  
Bart Goossens, and Wilfried Philips

TELIN-IPI, Ghent University - imec, 9000 Gent, Belgium

**Abstract:** One of the main requirements for multi-sensor cooperative tracking, is the need to simultaneously capture and process information provided by a wide range of sensors, and the additional information obtained during the processing. This work presents a novel architecture that uses a shared memory scheme, that communicates a series of sensing and processing plugins being executed in parallel, each on its own independent thread. The system presented consists of four main components: 1) The *shared memory* part, that uses a blackboard pattern that relies on a central index of pointers that contain the information to be shared, this information can be variables, objects, and even functions. 2) The *plugin manager*, using a singleton pattern to load, initialize, configure, and execute the plugins. 3) The *shared logger* centralizes the system log by writing the debug and execution intimation from the system and the plugins to a central synchronized location. 4) The *plugins* are the main part of the cooperative system, providing the necessary framework to capture, process, display, and record the information provided by sensors. The plugins of the system are designed to be easily implemented based on existing code by maintaining the external library dependencies of the architecture to a minimum, (*pthread*s and *c++11*) and *platform independent* (tested on Windows 7,8, vista, X, linux). In this work we present the main design of the proposed architecture, the use cases it has been tested on, and the current and future work where it will be used.

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